

4760 & Ad. Wk.

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Diag. Cht. No. 8552 & 8502-2

Form 504

DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY
E. Lester Jones, Director

State: SW Alaska

DESCRIPTIVE REPORT

Topographic }
 Hydrographic } Sheet No. 'E' 4760

LOCALITY
Kenai Peninsula
Nuka Bay

East Arm

1927.

CHIEF OF PARTY
R. R. Lukens, H. & G. Engr.

DESCRIPTIVE REPORT
To Accompany Hydrographic Sheet No. E

Chief of Party - - - - - R. R. Lukens, H & G Engr.

Work executed under instructions issued to the Commanding Officer of the Str. SURVEYOR, dated February 3rd, 1927.

General Description:- This sheet covers the East Arm of Nuka Bay and also Mc Arthur Pass, and joins Hydrographic Sheet (field letter) "F" on the southern part of this sheet. No hydrography has been done eastward of Mc Arthur Pass. All shoreline and signals on this sheet are found on topographic sheet (field letter) "E".

Survey Methods:- Nearly all the soundings on this sheet were taken from the SURVEYOR'S launch # 3, which was equipped with a sounding machine driven by a shaft connected to the launch engine. The sounding wire, stranded, was lead over a sheave suspended from a pipe extending outboard on the starboard quarter. An 18 lb. lead was generally used, but it was found that a heavier lead would reach the bottom quicker and thereby save considerable time when indeep water. Consequently, 24 and 36 lb. leads were sometimes used.

Hand lead soundings were taken in Mc Arthurs Pass and in the entrance to James Lagoon. Due to the difficulty in sounding with a hand lead from the launch, such soundings were only taken in important places and where the water was comparatively shoal. Soundings were first taken through Mc Arthurs Pass by machine. Then the Pass was sounded out by hand lead and plotted on the insert, scale 1:10000. Mc Arthur Pass and the entrance to James Lagoon could only be sounded at slack water on account of strong currents at other times.

Due to a very rainy season, this sheet was only completed by working on Sundays and holidays, when good weather occurred on those days. At the end of "F" day, the sounding machine broke beyond repairs in the field, leaving Arthur Cove unsurveyed. A few soundings were taken on the next day in this cove, from the launch Wildcat, using a long lead line and stopping for each cast. The broken sounding machine also prevented extending the hydrography eastward from Mc Arthur Pass as had been planned.

Hydrography in East Arm was considerably hampered by drift ice, especially in the northern part. The ice at the face of the Glacier fortunately cleared away so that soundings could be taken here without much delay in the work. When among thick ice, so that frequent changes of course were necessary, positions were taken on every sounding.

General depths and shoals:- The water in East Arm and adjacent bays and coves, is deep and clear of dangers. The only shoal of importance lies about 1/2 mile south of Δ Wood, and has a least depth, found, of 10 fathoms. There is no kelp here or other surface indications of a shoal.

Channels:- Mc Arthur Pass is the only important channel on this sheet. This pass is straight and easily navigated. There are no known dangers in the approaches, and in the narrowest part, there is a clear channel in the center of the pass, 60 meters wide, having a depth of 5 fathoms and over. Both shores, in the narrowest part of the pass, are lined with thick kelp, which extends approximately out to the 5 fathom curve. The bottom in the narrowest part is composed of smooth rock and small boulders. A spit makes out from the southern shore, in the narrowest part, composed of gravel and boulders, with deep water close-to.

Mc Arthur Pass is extensively used by small vessels proceeding along the coast, and affords a shorter and more protected route than the route outside the Pye Islands. Vessels larger than fishing vessels have avoided this route, heretofore, on account of lack of surveys. This route is especially valuable, when used in connection with the route thru Nuka Island Pass. (See topographic sheet "G" with descriptive report).

Anchorage:- Fishing vessels frequently anchor near the head of Morning Sun Cove, in 10 to 12 fathoms, rocky bottom. Chance Lagoon affords protected anchorage for small vessels, but the bottom is rocky and anchors will not hold well in heavy weather. There is a large, flat, bare rock in the entrance, eastward of which is foul. The entrance channel, westward of this rock, is clear, and by favoring the west side, small vessels of less than 8 feet draft, should have no difficulty in entering. The Wildcat has been thru both passages.

Small vessels can find good anchorage in the small bight on the south side of Mc Arthur Pass, close to westward of the narrowest part, in 7 to 11 fathoms, mud bottom. This anchorage is subject to strong williwaws in stormy weather, and local fishermen prefer to anchor in the bight on the northern side of the pass, 1 mile eastward of Δ Mac, in 10 to 15 fathoms, rocky bottom. Large vessels anchor near the head of Arthur Cove, in 28 to 30 fathoms, mud bottom.

Windy Bay has two possible anchorages, one in the cove on the northern side, in 10 to 20 fathoms, mud bottom, and the other on the southeastern side of the bay in 12 to 15 fathoms, rocky bottom. Neither of these anchorages are especially good. The bight on the northeastern side of the bay is foul.

Large vessels can find good anchorage near the head of Moonlight Bay, in 15 to 20 fathoms, mud bottom. Small vessels can find well protected in Midnight Cove in 9 to 16 fathoms, mud bottom.

Icy Cove has well protected anchorage in 6 to 8 fathoms, mud bottom, but would be dangerous due to drift ice. With northwesterly winds, both Moonlight Bay and Windy Bay might become filled with drift ice. Midnight Cove affords the best anchorage, since it is doubtful whether ice in serious quantities would ever enter this cove.

The entrance to Mc Carty Lagoon nearly bares at low water, but shallow draft vessels could enter at high tide. High water slack is the best time for entering, since at strength of tide there is a very strong current. There are reported depths of 15 to 20 fathoms, mud bottom, inside the lagoon.

James Lagoon has general depths of 12 to 15 fathoms, mud bottom. Vessels should approach the shore with caution since large

mud banks make off for considerable distance in many places, especially from the northern and eastern shore. The entrance channel has a least depth, in the center of the channel, of ¹⁷ fathoms at low water. Due to strong currents, this passage can only be navigated at slack tide. Care must be taken to avoid the sand spit on the eastern side of the entrance. The entrance is often obstructed by ice and ice is carried through the entrance into the lagoon.

Currents:- In Mc Arthur Pass, the current has an estimated velocity of 3 to 4 knots at strength, in the narrowest part. Slack water occurs about 1 hour and 55 minutes before the corresponding low and high waters at Kodiak, (mean of four observations).

In the entrance to James Lagoon the current has an estimated velocity of 6 to 10 knots. Highwater slack occurs about 20 minutes before the corresponding high water at Kodiak (one observation), and low water slack about 50 minutes after the corresponding low water at Kodiak (mean of two observations).

In the entrance to Mc Carty Lagoon the current at strength is estimated to be from 8 to 12 knots. There were no observations taken as to the time of slack water, but these times are probably similar to those at James Lagoon.

A strong current sets under the drifting ice pack at flood tide, and small vessels lying close to this area should use precaution to prevent being set into this ice field, where the vessel would surely be ground to pieces by the ice. It is estimated that there is a depth of about 1 fathom over this terminal moraine at the face of the ice pack with much greater depths, 10 fathoms and over, under the drifting ice.

Ice:- Usually the limits of the drifting ice pack as shown on the sheet are not clearly defined, the solid mass of drifting ice extending for a mile or more farther into the Arm. With northerly breezes a greater part of East Arm will be covered with drift ice, but there is usually a navigable channel free from ice along one shore or the other. The large bergs are lifted over the terminal moraine on high tides and ice is always thickest in East Arm and the main part of Nuka Bay, after spring tides. With southerly breezes, the Arm will be entirely free from ice, except near its head. With easterly or westerly breezes, the ice will pack along the opposite shore, leaving the main part of the bay and the lee shore, free.

New Place Names: Are described in the topographic Descriptive Report.

Sailing Directions:- Are given in the Coast Pilot Notes, forwarded this season.

Respectfully submitted,

Approved and Forwarded:

R. R. Lukens.
R. R. Lukens, H & G Engr.
Comdg. Str. SURVEYOR.

Wm. D. Patterson
Wm. D. Patterson
H & G Engr. C & G Survey

STATISTICS
FOR HYDROGRAPHIC SHEET NO. E

NUKA BAY - EAST ARM.

Date	Day	Vol.	Positions	Soundings	Miles	Launch
Aug. 26	a	1	66	183	10.6	# 3
" 29	b	1	63	181	10.4	"
Sept. 10	c	1-2	118	348	20.4	"
" 11	d	2	121	292	25.8	"
" 12	e	2-3	142	363	31.5	"
" 13	f	3	103	288	25.4	"
" 14	g	3	10	15	1.8	Wildcat
TOTALS			623	1670	126.9	
AREA:- 26 Sq. Miles						

J. J. H.

(11)

Copy for Record Section files.

April 20, 1928.

Division of Hydrography and Topography:

Division of Charts:

Tide reducers are approved in
5 volumes of sounding records for

HYDROGRAPHIC SHEET 4760

Locality: **NUKA BAY, S. W. ALASKA.**

Chief of Party: **R. R. Lukens, 1927.**

Plane of reference is **M L L W**

6.9 ft. on tide staff at **Nuka Bay**

2.4 ft. ----- **do** ----- **Seward**

Condition of records satisfactory except as checked below:

1. Locality and sublocality of survey omitted.
2. Month and day of month omitted.
3. Time meridian not given at beginning of day's work.
4. Time (whether A.M. or P.M.) not given at beginning of day's work.
5. Soundings (whether in feet or fathoms) not clearly shown in record.
6. Leadline correction entered in wrong column.
7. Field reductions entered in "Office" column.
8. Location of tide gauge not given at beginning of each day's work.
9. Leadline corrections not clearly stated.
10. Kind of sounding tube used not stated.
11. Sounding tube No. entered in column of "Soundings" instead of "Remarks".
12. Legibility of record could be improved.
13. Remarks.

G. W. H. H.

Chief, Division of Tides and Currents.

Added to Orig Report

SUPPLEMENTARY DESCRIPTIVE REPORT

to accompany

HYDROGRAPHIC SHEET E.

4760 Add'l Work 1928

Supplementary Report to Accompany Descriptive Report of
Hydrographic Sheet "E"

Original work executed in 1927.

Supplementary work executed on May 8, 1928.

Chief of Party - - - - - R. R. Lukens

Work executed under instructions issued to Commanding Officer,
Str. SURVEYOR, dated February 3, 1927. ✓

Locality: Arthur Bay, one of the eastern arms of Nuka Bay one mile
south of McArthur Pass.

Extent: Two lines were run in this bay late in the season of
1927. As the sounding machine was out of order, the work was done
with the hand lead which could reach no greater depth than 30 fathoms. ✓
Many of the soundings in the center of the bay are therefore $\frac{0}{30}$
fathom soundings.

The entire bay was resounded without regard to the previous work. Lines were run somewhat less than 300 meters apart normal to the long axis of the bay. An 18# lead with power machine in launch #3 was used. The usual methods were employed in this work. ✓

As no tide gauge was in operation in this locality soundings are to be referred to Seward with local time and height correction determined in 1927. No soundings have been reduced in the field. ✓

C. A. Egner.

C. A. Egner
H. & G. Egner.

Note by Chief of Party;

Owing to the fact that there are no critical depths on this sheet, it was not considered necessary to erect a tide staff and read tides. ✓

It is noted that the soundings are not spaced closely enough near the shore ends of the lines, but it was not thought to be serious enough to hold the ship to obtain additional soundings. This hydrography was done by Mr. Egner who has had 14 years experience, and I assumed that he would know the proper spacing of soundings in such waters.

R. R. Lukens.
R. R. Lukens

STATISTICS

Hydrography, Arthur Bay, S. W. Alaska.

Date	Day	Vol.	Soundings	Miles	Positions	Boat Used
4/8/28	a	1	59	5.4	34	Launch #3
4/9/28	b	1	<u>6</u>	<u>0.4</u>	<u>4</u>	"
			65	5.8	38	

Field Records Section
Report on Hyd. 4760

Surveyed in Aug. Sept. 1927

Chief of Party R. R. Dubois - Surveyed by W. D. Patterson
Protracted by W. D. P. - Soundings penciled by W. D. P.
Verified and inked by J. Fleming

- ① The records and also the plan and character of the development fulfilled the requirements of 'General Instructions' ✓
- ② As the check upon the protracting progressed it became apparent that this part of the work was carelessly executed and therefore, only about 13% of positions were checked.
The wide choice of signals from practically all positions made it possible to obtain a strong fix for positions.
In practically every instance the time intervals between soundings were uniform thus greatly expediting the work of checking soundings.
- ③ This sheet was tested for shrinkage and every triangulation ^{station} checked from the 'Geographic Positions' - all were found to be accurately located ✓
- ④ It would appear from the configuration of the shore line with its numerous lagoons and coves that the sounding line system employed gave a good bottom profile and the omission of cross-sounding lines seems reasonable. It should be noted, however, that the average distance between sounding lines in the East Arm proper is about 1200 meters and shoal areas may conceivably exist between any two of these lines.

The shoal area just south of triangulation station "WOOD" is not fully developed - the development should have been extended more to the South East and East of sounding 31 fathoms position 137-C

⑤ The soundings plotted on this sheet by Mr Patterson were the reduced field soundings but these soundings were further revised in the office so that it became necessary to revise nearly all ✓ field soundings values and substitute office values.

⑥ Rock dangers were not very conspicuous and these were strengthened considerably. ✓

Rock dangers south of triangulation station 'LAKE' were not accurately located and this was corrected. ✓

⑦ Mc Arthur Pass was developed on 'a' day and again on 'c' day. The "insert" at scale of 1:10,000 contained only the development of 'c' day and the accompanying signals.

The signals used in the development of Mc Arthur Pass on "a" day were transferred from the 1:20,000 scale to the 1:10,000 scale and the positions and soundings plotted.

The insert therefore contains the development of both 'a' and 'c' days. The signals transferred were 'Yel' and 'Now'.

It became necessary to transfer triangulation station 'STEEL POINT' also, but its great distance necessitated plotting it beyond the limits of the sheet.

The field work on this sheet is considered Excellent

J. Fleming

July 2nd 1928

See following report on additional work etc.

FIELD RECORDS SECTION

Report on H. 4760 (Additional work) Surveyed in 1928
Chief of Party, P.R. Fuhens. Surveyed by C.H. Egner
Projected by _____ Inded by _____

The projecting and plotting of additional work in Arthur Cove is very good excepting position 33 a which was found to be 60 meters out of position. ✓

All of the additional work has been entered in red ✓ and the few soundings shown in black at the southern end of the cove represent the work of the previous season.

A number of positions near the shore were found to face on the land side of the shore line.

A note on the boat sheet refers to the probability of the lights in which these positions and soundings were taken being deeper than shown on the top sheet.

Following the suggestion contained in the note, the lights were enlarged whenever necessary.

The positions for "9" day of the previous season may be seen between the sounding line of the latest work.

Practically all of these soundings on position were $\frac{0}{29}$ soundings and were erased when the additional work was plotted and inded.

No unusual features are noted in this cove except the 9 fathom sounding at the lower end of the cove and which was obtained during the previous season. ✓

John Fleming
July 20th 1928

IN REPLY ADDRESS THE DIRECTOR
U. S. COAST AND GEODETIC SURVEY
AND NOT THE SIGNER OF THIS LETTER

AND REFER TO NO. 11-DEM

DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY

WASHINGTON

August 1, 1928.

SECTION OF FIELD RECORDS

Report on Hydrographic Sheet No. 4760
and Additional Work

East Arm, Nuka Bay, Alaska

Surveyed in 1927 and 1928

Instructions dated February 3, 1927 (SURVEYOR)

Chief of Party, R. R. Lukens.

Surveyed by W. D. Patterson (1927); C. A. Egner (1928).

Protracted and soundings plotted by W. D. P. (1927); Field Party (1928).

Verified and inked by J. Fleming.

1. The records conform to the requirements of the General Instructions.
2. The plan and character of development fulfill the requirements of the General Instructions.
3. The plan and extent of the survey satisfy the specific instructions with the exception that 600 meter lines should have been run throughout the East Arm of Nuka Bay. This it is believed is the proper interpretation of Paragraphs 31 and 32 of the specific instructions of Feb. 3, 1927.
4. The usual depth curves could be completely drawn.
5. The usual field plotting was done by the field party and was as a rule well done. However, rock symbols were not inked very conspicuously and most of these had to be gone over by the office draftsman.
6. The junction with H. 4721 is satisfactory at the shore ends. In the middle of East Arm the distance between adjacent lines on the two sheets is too great to consider a proper junction having been made.

There are no other contemporary surveys that border on this sheet.

7. Very few cross lines were run. The regular system of lines is for the most part spaced too far apart to permit of a comparison of adjacent lines.
8. While this survey may adequately meet the present commercial requirements of this area, it is believed that additional work should be done in the following places in order that the survey may be considered a complete one.
 - a. Split lines should be run in East Arm where at present the lines are spaced 1200 meters apart.
 - b. An adequate development made of the 100 fathom curve east of Harrington Point.
 - c. Additional soundings should be taken to develop the 50 fathom curve in the vicinity of lat. $59^{\circ} 30'$, long. $150^{\circ} 26'$ and the 10 fathom shoal in the same locality should be dragged.
 - d. Additional soundings are required to develop the 50 fathom curve to the southwest of \triangle Lake (lat. $59^{\circ} 30' 1/2''$, long. $150^{\circ} 23'$).
 - e. McCarty Lagoon should be surveyed, since boats can enter at high water and there are reported 15 to 20 fathoms inside.
 - f. Additional soundings should be taken in Midnight Cove, particularly in the entrance to the inner anchorage.
 - g. Owing to the importance of McArthur Pass, split lines in the west approach to the pass would be desirable. Also additional lines should be run at the eastern end of the narrows proper (see insert on sheet).
 - h. Additional development to the eastward of \odot Left (lat. $59^{\circ} 28' 1/4''$, long. $150^{\circ} 19'$) should be made.
9. In addition to the places mentioned above, it should be borne in mind when considering further work here, that experience has shown that in localities such as these, dangers usually lurk off rocky points and promontories and it may therefore be desirable to run additional lines in such places.
10. Attention is called to the fact that the depths in James Lagoon are referred to the same datum as those in the arm. While the tide in the lagoon no doubt lags behind the tide on the outside, no correction was applied since no tide staff was established inside the lagoon. The correction would probably not be sufficient to make any appreciable change in the depths inside.

The fact is mentioned here merely as a theoretical consideration.

11. Reviewed by A. L. Shalowitz, July, 1928.

Approved:

Chief, Section of Field Records (Charts)

Chief, Section of Field Work (H. & T.)

Copy for Section of Field Records file.

(11)

Division of Hydrography and Topography:

Division of Charts:

Tide reducers are approved in
1 volume of sounding records for

HYDROGRAPHIC SHEET 4760 Additional Work.

Locality: McArthur Pass, S.W. Alaska

Chief of Party: R.R. Lukens, 1928
Plane of reference is M.L.L.W.
2.4 ft. on tide staff at Seward

Condition of records satisfactory except as checked below:

1. Locality and sublocality of survey omitted.
2. Month and day of month omitted.
3. Time meridian not given at beginning of day's work.
4. Time (whether A.M. or P.M.) not given at beginning of day's work.
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9. Leadline corrections not clearly stated.
10. Kind of sounding tube used not stated.
11. Sounding tube No. entered in column of "Soundings" instead of "Remarks".
12. Legibility of record could be improved.
13. Remarks.

G. W. de

Chief, Division of Tides and Currents.

DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY

REG. NO. 4760

HYDROGRAPHIC TITLE SHEET

The Hydrographic Sheet should be accompanied by this form, filled in as completely as possible, when the sheet is forwarded to the Office.

Field No. E

REGISTER NO. ⁴⁷4760

State ~~S. W.~~ Alaska

General locality ~~Nuka Bay~~ Kenai Peninsula

Locality East Arm of Nuka Bay

Scale 1:20,000 Date of survey Aug. - Sept., 1927

Vessel Str. SURVEYOR

Chief of Party R. R. Lukens

Surveyed by W. D. Patterson

Protracted by W. D. Patterson

Soundings penciled by W. D. Patterson

Soundings in fathoms ~~xxxx~~

Plane of reference M L L W

Subdivision of wire dragged areas by

Inked by

Verified by

Instructions dated February 3rd, 1927, 1927

Remarks:

DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY

REG. NO. 4760

HYDROGRAPHIC TITLE SHEET
Submitted on Boat Sheet - To be added to orig. sheet

The Hydrographic Sheet should be accompanied by this form, filled in as completely as possible, when the sheet is forwarded to the Office.

Field No. "E" ⁴⁷⁶⁰ (1927) 4760 Add'l. Work

REGISTER NO.

State ~~S. W.~~ Alaska

General locality ~~Arthur Bay~~ Kenai Peninsula

Locality ~~Mc Arthur Pass~~ E. Arm of Nuka Bay - Arthur Bay

Scale 1:20000 Date of survey May 8, 1928

Vessel Launch #3

Chief of Party R. R. Lukens

Surveyed by C. A. Egner

Protracted by

Soundings penciled by

Soundings in fathoms ~~FOOT~~

Plane of reference Soundings not reduced.

Subdivision of wire dragged areas by

Inked by J. FLEMING JULY 20 1928

Verified by J.F.

Instructions dated February 18, 1928.

Remarks: This work submitted on Boat Sheet - To be added to orig. Sheet 4760